This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-6 (canceled)

Claim 7 (previously presented): Apparatus for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

a sequence generator for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

a waveform generator, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission;

wherein said sequence generator generates each of said one or more pilot tone hopping sequences in accordance with $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$; and

wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 8 (original): The invention as defined in claim 7 wherein said prescribed number of symbol intervals T is a prime number.

Claim 9 (original): The invention as defined in claim 7 wherein each of said one or more pilot tone hopping

sequences generated includes a prime number of distinct tones.

Claim 10 (previously presented): The invention as defined in claim 7 wherein said permutation operator *Z* is defined on [MIN (*0*, *d*), MAX ($N_t - 1, p - 1 + d$)] and " N_t " is the total number of tones in the system, *p* is a prime number of tones and "*d*" is a frequency.

Claim 11 (previously presented): The invention as defined in claim 7 wherein each of said one or more pilot tone hopping sequences has a slope "*a*".

Claim 12 (original): The invention as defined in claim 11 wherein said slope "a" is unique to said base station among one or more neighboring base stations.

Claim 13 (previously presented): Apparatus for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

a sequence generator for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

a waveform generator, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission; and

wherein said waveform generator generates a waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i} e^{2\pi f_i^{S_i} \Delta t t}$, where $f_k^{S_i}$ are given by the

sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$.

Claim 14 (original): The invention as defined in claim 13 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 15 (previously presented): Apparatus for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

a sequence generator for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid; and

a waveform generator, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission,

wherein said waveform generator generates a waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i} \Gamma_k^{S_i} e^{2\pi f_k^{S_i} \Delta f t}$, where $f_k^{S_i}$ are given by the sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$, and $\Gamma_k^{S_i}$ = 1, if $f_k^{S_i} \in [0, N_t - 1]$, and $\Gamma_k^{S_i}$ = 0, otherwise.

Claim 16 (original): The invention as defined in claim 15 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 17 (original): The invention as defined in claim 16 wherein said waveform generator includes a transmitter for transmitting said pilot tones and wherein pilot tones in phantom tone regions defined by [MIN (0, d), 0] and [$N_t - 1$, MAX ($N_t - 1, p - 1 + d$)], where "N_t" is the total number of tones in the system, p is a prime number of tones and "d" is a prescribed frequency, are not transmitted

Claims 18 - 23 (canceled)

Claim 24 (previously presented): A method for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising the steps of:

generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

in response to said one or more pilot tone hopping sequences, generating a waveform for transmission; and

wherein said step of generating one or more pilot tone hopping sequences includes a step of generating each of said one or more pilot tone hopping sequences in accordance with $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, and

wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 25 (original): The method as defined in claim 24 wherein said prescribed number of symbol intervals T is a prime number.

Claim 26 (original): The method as defined in claim 24 wherein said step of generating one or more pilot tone hopping sequences includes a step of generating each of said one or more pilot tone hopping sequences having a prime number of distinct tones.

Claim 27 (previously presented): The method as defined in claim 24 wherein said permutation operator Z is defined on [MIN $(0, d)$, MAX $(N_t - 1, p - 1 + d)$] and "N_t" is the total number of tones in the system, p is a prime number of tones and "d" is a frequency.

Claim 28 (previously presented): The method as defined in claim 24 wherein said step of generating one or more pilot tone hopping sequences includes a step of generating each of said one or more pilot tone hopping sequences having a slope "a".

Claim 29 (original): The method as defined in claim 28 wherein said slope "a" is unique to said base station among one or more neighboring base stations.

Claim 30 (previously presented): A method for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising the steps of:

generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

in response to said one or more pilot tone hopping sequences, generating a waveform for transmission; and

wherein said step of generating said waveform includes a step of generating said waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i} e^{2\pi j f_k^{S_i} \Delta f t}$, where $f_k^{S_i}$ are given by the sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, where Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$.

Claim 31 (original): The method as defined in claim 30 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 32 (previously presented): A method for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising the steps of:

generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being

generated at frequency and time instants in a time-frequency grid;

in response to said one or more pilot tone hopping sequences, generating a waveform for transmission; and

wherein said step of generating said waveform includes a step of generating said waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i}\Gamma_k^{S_i} e^{2\pi f_i^{S_i}\Delta f t}$, where $f_k^{S_i}$ are given by the sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, where Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$, and $\Gamma_k^{S_i}$ = 1, if $f_k^{S_i} \in [0, N_t - 1]$, and $\Gamma_k^{S_i}$ = 0, otherwise.

Claim 33 (original): The method as defined in claim 32 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 34 (original): The method as defined in claim 33 further including a step of transmitting said pilot tones and wherein pilot tones in phantom tone regions defined by [MIN (0, d), 0] and [$N_t - 1$, MAX ($N_t - 1, p - 1 + d$)], where "N_t" is the total number of tones in the system, p is a prime number of tones and "d" is a prescribed frequency are not transmitted.

Claims 35 - 40 (canceled)

Claim 41 (previously presented): Apparatus for use in a base station in an orthogonal frequency division

multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

means for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid; and

means, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission,

wherein said step of generating one or more pilot tone hopping sequences includes a step of generating each of said one or more pilot tone hopping sequences in accordance with $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, and

wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 42 (original): The invention as defined in claim 41 wherein said prescribed number of symbol intervals T is a prime number.

Claim 43 (original): The invention as defined in claim 41 wherein said means for generating one or more pilot tone hopping sequences includes means for generating each of said one or more pilot tone hopping sequences having a prime number of distinct tones.

Claim 44 (original): The invention as defined in claim 41 wherein said permutation operator Z is defined on [MIN $(0, d)$, MAX $(N_t - 1, p - 1 + d)$] and "N_t" is the total number of

tones in the system, p is a prime number of tones and "d" is a prescribed frequency.

Claim 45 (previously presented): The invention as defined in claim 41 wherein said means for generating one or more pilot tone hopping sequences includes means for generating each of said one or more pilot tone hopping sequences having a slope "a".

Claim 46 (original): The invention as defined in claim 45 wherein said slope "a" is unique to said base station among one or more neighboring base stations.

Claim 47 (previously presented): Apparatus for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

means for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

means, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission; and

wherein said means for generating said waveform includes means for generating said waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i} e^{2\pi j f_k^{S_i} \Delta f t}$, where $f_k^{S_i}$ are given by the sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, where Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known

symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$.

Claim 48 (original): The invention as defined in claim 47 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 49 (previously presented): Apparatus for use in a base station in an orthogonal frequency division multiplexing (OFDM) based spread spectrum multiple access wireless system comprising:

means for generating one or more pilot tone hopping sequences each including pilot tones, said pilot tones each being generated at frequency and time instants in a time-frequency grid;

means, responsive to said one or more pilot tone hopping sequences, for generating a waveform for transmission; and

wherein said means for generating said waveform includes means for generating said waveform in accordance with $\sum_{i=1}^{N_{pil}} C_k^{S_i} \Gamma_k^{S_i} e^{2\pi j f_k^{S_i} \Delta f t}$, where $f_k^{S_i}$ are given by the sequence $S_i = \{f_0^{S_i}, f_1^{S_i}, \cdots f_k^{S_i}, \cdots\}$, for $i = 1, \cdots N_{pil}$, where Δf is the basic frequency spacing between adjacent tones, $C_k^{S_i}$ is a known symbol to be transmitted at the k^{th} symbol instant and tone $f_k^{S_i}$, and $\Gamma_k^{S_i}$ = 1, if $f_k^{S_i} \in [0, N_t - 1]$, and $\Gamma_k^{S_i}$ = 0, otherwise.

Claim 50 (original): The invention as defined in claim 49 wherein $f_k^{s_i} = Z\{(a(k \bmod T) + s_i) \bmod p + d\}$, where "k" is a time instant index, "T", "a", "s_i" and "d" are integer constants, "p" is a prime constant, and "Z" is a permutation operator.

Claim 51 (original): The invention as defined in claim 50 further including means for transmitting said pilot tones and wherein pilot tones in phantom tone regions defined by [MIN (0, d), 0] and [$N_t - 1$, MAX ($N_t - 1, p - 1 + d$)], where "N_t" is the total number of tones in the system, p is a prime number of tones and "d" is a prescribed frequency are not transmitted.

Claim 52 (new): The invention as defined in claim 7 wherein said pilot tone hopping sequence generated by said sequence generator is a truncated Latin Square based hopping sequence.